Fact Sheet

United States Air Force

Secretary of the Air Force, Office of Public Affairs, Washington, D.C. 20330

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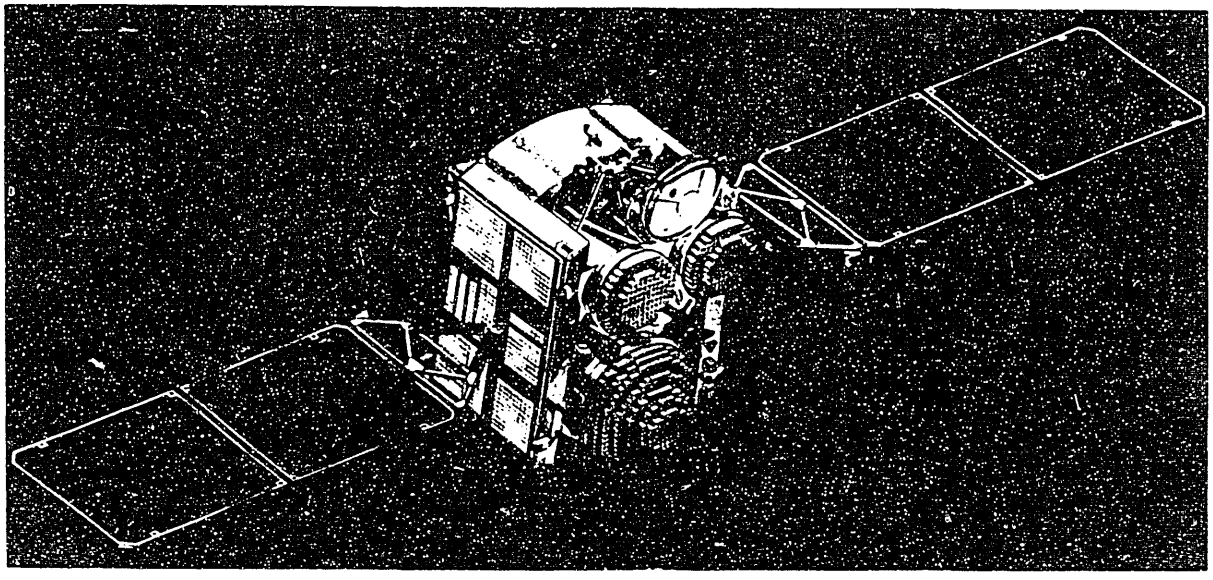

DEFENSE SATELLITE COMMUNICATIONS SYSTEM

The Defense Satellite Communications System provides the Department of Defense, the Department of State, and other U.S. government agencies worldwide communications that cannot be provided by commercial service or other military systems. This satellite system also provides the Worldwide Military Command and Control System reliable circuits for carrying essential surveillance, warning, and other command and control communications; and is used for some tactical requirements.

Air Force Space Division, part of Air Force Systems Command, manages the design, development, production and launch of the satellites. The system uses super-high frequency, high-capacity satellites, and fixed and mobile earth terminals.

History

The potential for satellites to provide secure, instantaneous worldwide communications was demonstrated by Project SCORE (Signal Communications Orbiting Relay Equipment) in 1958. The project used an Atlas booster with a communications repeater that transmitted President Eisenhower's Christmas message to the world. This was the first time the human voice had been beamed from space.

In the 1960s the Department of Defense began to build a network of satellites for military communications. The program advanced through three phases as technological improvements came about.

In Phase I of the program, 26 small communications satellites, weighing about 100 pounds each, were launched between June 1966 and June 1968. Each satellite had one channel and relayed voice, imagery, computerized digital data, and teletype transmissions. The satellites were designed to last three years. Phase I satellites operated in a circular orbit 20,930 miles above Earth

at a speed that nearly kept each satellite over a point on the equator.

Phase II was a second-generation program that replaced Phase I. It incorporated proven technology from Phase I and other satellite programs. The first Phase II satellites were launched in 1971. They have increased communications load, transmission strength and double the lifetime expectancy of the first communications satellites. They also contain propulsion systems for orbital repositioning to support contingency operations. The two dish antennas on Phase II satellites are steerable by ground command, and can concentrate their electronic beams on small areas of the Earth's surface for intensified coverage.

In 1973 planning began for a third-generation satellite system that would carry multiple-beam antennas to provide flexible coverage, resist jamming, last twice as long as Phase II satellites, and have six active communications transmitter channels instead of four. The first Phase III satellite was launched in 1982.

Antenna design for Phase III satellites allows users to switch between fixed, Earth coverage and multiple-beam antennas. The latter provides an Earth-coverage beam as well as electrically steerable area and narrow-coverage beams. In addition, a steerable transmit dish antenna provides a spot beam with increased radiated power for users with small receivers. In this way the communications beams are tailored to suit the needs of different size user terminals almost anywhere in the world.

Operations

Communications capabilities and positioning of Phase II satellites are centrally controlled from the Air Force Satellite Test Center, Onizuka Air Force Station, Calif., through a worldwide network of satellite control facility remote tracking stations. The Phase III system is designed so that selected ground terminals also will have the ability to control the satellites' communications capabilities and their positions on orbit. Eventually, these ground terminals primarily will control the satellite communications systems, and the Onizuka facility will control other systems and maintain proper orbit. This will increase the communications system's flexibility by providing a more direct response to user requirements and by providing Phase III satellites backup capability, should it ever be needed.

Satellites of all three phases can be put in orbit by Titan 34D launch vehicles. Phase III satellites also are designed for on-orbit delivery by the space shuttle.

Specifications

Primary function: satellite communications system

Prime contractors: Phase I -- Ford Aerospace and Communications Corp.; Phase II -- TRW System Group; Phase III -- General Electric, Space Division; General systems engineering and technical direction: Aerospace Corp.

Power plant: Phase II -- solar arrays, 535W at launch decreasing to 358W after five years; Phase III -- solar arrays, 1,100W at launch decreasing to 837W after 10 years

Dimensions: Phase I -- diameter 3 ft, height 2 ft 8 in; Phase II -- diameter 9 ft, neight 13 ft; Phase III -- diameter 8 ft 10 in, height 6 ft 8 in

Weight: Phase I -- 100 lb (dry); Phase II -- 1,181 lb (dry), 1,365 lb (wet); Phase III -- 1,865 lb (dry), 2,490 lb (wet)

Orbit: Phase I -- 20,930 miles, near-synchronous equatorial; Phase II and III -- 23,230 miles, synchronous equatorial

Status: Phase I -- replaced; Phase II and III -- operational